

# Sunlight and Vitamin D: They're Not the Same Thing!

Jul. 28th, 2023

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Published on July 28, 2023

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I am a great fan of sunlight exposure, to both the skin and the eyes. We have been brainwashed into believing that the sun is toxic, whereas in fact it is life-giving

People who live in places with little sun have

statistically higher risk to many chronic conditions, such as multiple sclerosis, diabetes, cardiovascular disease, autism, Alzheimer's disease, and age-related macular degeneration.<sup>1</sup>

There is a great deal of epidemiological evidence suggesting that sunlight exposure protects from many different types of cancer. The sun has always been a resource for planet earth, and, just as sunlight is essential for plants to grow, I believe it plays an essential role in energizing animals, including humans.

Chances are, you have been told by your dermatologist to “stay out of the sun and take a vitamin D supplement every day.” This seems like good advice, because we have been well trained to believe that the sun causes skin cancer, and

the only reason to get out in the sunlight is to boost vitamin D levels through its UV-stimulated synthesis in the skin.

Mothers are now well trained to slather sunscreen on their children every few hours on a day at the beach, and they believe that this will keep them safe from skin cancer and has no down side.

The story is not that simple, however. In a paper published in 2016, Richard Weller wrote:

“A substantial body of evidence shows that sunlight has health benefits and that these are independent of vitamin D and thus cannot be reproduced by oral supplementation.”<sup>2</sup>

Since the beginning of time on earth, the sun has always been there. Biological organisms evolved with a constant supply of energy they could count on every day with the rising sun. It is well known that plants use the energy of sunlight to convert inorganic carbon into organic matter, with the help of chlorophyll.

Why would animals ignore such an obvious energy source? I believe that animals too have developed a mechanism to safely exploit the sun's energy – through the oxidation of sulfur to sulfate, and with the help of cholesterol.

This reaction takes place in the skin, catalyzed by sunlight, and it is vital to our long-term health.

UV radiation is recommended to treat many different skin conditions, including psoriasis, eczema, jaundice and acne. Sunlight may also be beneficial in various autoimmune diseases, including rheumatoid arthritis, systemic lupus erythematosus, inflammatory bowel disease, and thyroiditis.

Many believe that the benefits of sunlight exposure are mainly due to vitamin D synthesis, and a natural conclusion is that vitamin D supplements would achieve

the same goal. However, when placebo-controlled studies are conducted on vitamin D supplementation, they usually produce disappointing results.

I believe the reason is that sunlight exposure is about a whole lot more than vitamin D synthesis in the skin.

Those who are familiar with my research will know that I believe that keratinocytes in the skin, endothelial cells lining the walls of surface veins, and red blood cells are able to exploit the energy in sunlight by oxidizing hydrogen sulfide to make sulfate.<sup>3</sup>

In the skin, the sulfate is conjugated with both vitamin D and cholesterol, and this makes these otherwise water-insoluble molecules water soluble. This greatly facilitates their transport in the blood, because they no longer have to be enclosed inside lipid particles like high-density lipoprotein (HDL) and low-density lipoprotein (LDL).

Sunlight exposure thus produces cholesterol sulfate as well as vitamin D sulfate, and it is the cholesterol sulfate that offers many of the benefits that are seen epidemiologically in sunny places. In fact, I believe that systemic sulfate deficiency is a key driver behind many chronic diseases that are on the rise in the industrialized nations.

The sulfate that is produced in response to sunlight also supplies sulfate to the glycocalyx, the mesh of extracellular matrix glycoproteins that line the walls of all blood vessels. Red blood cells hand off cholesterol sulfate to the endothelial cells as they traverse the capillaries, and both the cholesterol and the sulfate are of vital importance to the endothelial cell's health.

The endothelial cells as well can incorporate the sulfate they synthesize themselves, directly into the glycocalyx.

Sulfate in the glycocalyx helps to maintain the structured water in the exclusion zone, a layer of gelled water that coats the surface of all the blood vessels. Not only does the gel provide protection of the wall from oxidative and glycation damage, but it also provides a slick surface for frictionless traversal of the capillary by the red blood cells.

And, perhaps most importantly, it carries a negative charge, creating a battery that is likely the main source of electricity for the body. Light, but, most especially, infrared light, causes the exclusion zone water layer to expand dramatically, by as much as a factor of four.<sup>4</sup>

The electricity held in the battery grows in direct correspondence. Prof. Gerald Pollack from the University of Washington in Seattle has popularized much of this story in his book, *Cells, Gels and the Engines of Life*.

## **2 Sunscreen and Melanin**

Most Americans heavily rely on sunscreen for sun protection if they are planning to be outside for an extended period. They strongly believe that they are protecting themselves from skin cancer through this practice, but, in fact, they may be increasing their risk to skin cancer.

In fact, sunscreen interferes with the body's natural mechanisms of sun protection, which have been perfected over hundreds of millions of years of life's evolution on earth.

### **2.1 Melanoma and Sunscreen**

Given how much advertising we get urging us to use sunscreen, people probably assume that there is plenty of evidence that sunscreen protects from skin cancer. If this is true, then it is hard to explain why melanoma prevalence has been

steadily rising in step with the rise in the use of higher and higher sun-protection-factor (SPF) sunscreens over the past two decades.

A study published in 2009 analyzed almost 300 million person-years of data over a 10 year period and concluded that the rate of skin melanoma increased by 3.1% per year from 1992 to 2004 in the United States.<sup>5</sup>

A population-based study published in 2019 involved 12,462 cases of head and neck melanoma in the United States and Canada spanning the interval from 1995 to 2014.<sup>6</sup> They found that this type of cancer had increased by 51 percent over two decades, with males aged 15 to 39 years being the population group most strongly affected.

Meanwhile, the sun protection market value increased from 940 million dollars in 2006 to 1.6 billion dollars in 2016.

As far back as 1996, a paper was published that investigated the question of whether sunscreen protects from skin cancer. They wrote:

“Our results support the hypothesis that sunscreens do not protect against melanoma, probably because of their ability to delay or avoid sunburn episodes, which may allow prolonged exposure to unfiltered ultraviolet radiation.”<sup>7</sup>

In other words, sunscreen gives you the illusion that you are safe because you don't feel the pain or experience the redness of the skin that naturally happens when your body is letting you know it's time to get out of the sun.

Your skin is getting damaged by too much UV radiation, but the signal that would stop the exposure is missing.

Worse than this, in my opinion, is that sunscreen disrupts the body's natural mechanism of sun protection: melanin synthesis. Sunscreen protection only lasts while the sunscreen is topically present.

Melanin, produced in response to sunlight exposure, on the other hand, builds up over time and eventually produces a healthy tan with protection that can last for weeks or even months later.

The smart way to protect from the potential damage of UV rays is to develop a tan slowly during the spring while the sun is not so intense, and this arms you with a defense against the intense summer sun that would otherwise be dangerous.

The powerful antioxidant effects of melanin protect you from the UV rays, while you can still enjoy the many health benefits of visible light and infrared light, far beyond what you would get from a vitamin D supplement.

Sunscreen also contains toxic ingredients that cause damage to the skin in ways that might result in sustained disruption of sulfate synthesis. Particularly disturbing is the aluminum that is added to emulsify the zinc oxide and titanium dioxide additives (the active ingredients).

Aluminum is known to suppress cytochrome P450 enzymes (CYP enzymes), and the enzyme that I propose is crucial for sulfate synthesis, endothelial nitric oxide synthase (eNOS), is an orphan CYP enzyme.

I believe that glyphosate, the active ingredient in the pervasive herbicide, Roundup, also disrupts eNOS, since it is known to suppress CYP enzymes in the liver in rat studies. Worse than this, it interferes with the shikimate pathway in the gut microbes, which is essential for producing the aromatic amino acids.<sup>8</sup>

One of these, tyrosine, is a precursor to melanin, so glyphosate likely induces melanin deficiency, which prevents you from developing a healthy tan, and therefore interferes with natural protective mechanisms against UV damage.

## **2.2 Melanoma, Sun Exposure and Vitamin D**

Instinctively, most people who are diagnosed with skin melanoma make special efforts to avoid the sun following diagnosis, which is probably a very bad idea. Remarkably, increased sun exposure, more frequent sunburns and solar elastosis (evidence of photo-aging in the skin) were all associated with improved survival statistics in a population study on 528 patients diagnosed with cutaneous melanoma.<sup>9</sup>

It has seemed logical that the reason for the benefit is the rise in vitamin D levels induced by sun exposure.

Indeed, vitamin D deficiency at the time of diagnosis is associated with a worse prognosis in melanoma.<sup>10</sup> Patients with stage IV melanoma had a 2-fold worse prognosis if they suffered from vitamin D deficiency at diagnosis.

Furthermore those who began with vitamin D deficiency and whose vitamin D levels either fell or increased by no more than 20 ng/mL had a hazard ratio of 4.68 compared to patients who were not deficient initially and whose vitamin D increased by more than 20 ng/mL over time.

However, a large population placebo-controlled study involving 36,282 postmenopausal women compared women who were supplemented with 400 IU vitamin D<sub>3</sub> and 1,000 mg elemental calcium every day for 7 years with controls given a placebo.<sup>11</sup>

Rates of skin melanoma and non-melanoma skin cancer were monitored over the 7-year period. There was no difference in rates of either benign or malignant

cancers between the two groups. This strongly suggests that vitamin D is not the reason for the improved survival with sun exposure.

## **2.3 Melanin, Infrared Light and Skin Cancer**

Melanin is able to transform 99.9 percent of absorbed sunlight into heat, and this greatly reduces the risk to skin cancer. It also enhances the amount of infrared you can receive from the sun. A fascinating study published in 2017 experimented with a novel idea to protect mice from skin cancer.<sup>12</sup>

It involved a new technique to treat melanoma skin cancer using a transdermal skin patch, infrared light, and melanin. Melanoma tumor cells produce high amounts of melanin. The researchers created a skin patch from ruptured melanoma cells, which they applied to the skin of mice (as a source of melanin).

They compared three groups of mice, the controls, mice with only the patch, and mice with the patch plus infrared light exposure. Viable melanoma cells were subsequently injected into all three groups to induce skin cancer, and 100 percent of the control group succumbed to melanoma cancer within a two-month period.

Among the ones with only the patch, only 13 percent of the mice survived. Remarkably, those who received both the infrared light and the patch were all still living after two months, and 87 percent had no tumors. One wonders what would have happened with only infrared and no patch!

## **3 Sunlight, Vitamin D Supplements and Disease**

In this section, I will address evidence that sunlight is protective against four distinct diseases and conditions: cancer, heart disease, hypertension, and bone fractures. In each case, studies have shown that vitamin D supplements cannot replace these benefits of sunlight.

## 3.1 Cancer

As far back as 1980, epidemiological studies showed an inverse geographical relationship between the amount of solar radiation and mortality rates for colon cancer.<sup>13</sup> Since then, numerous studies have shown that a high serum level of vitamin D is associated with reduced cancer risk, for diverse types of cancer.

A review paper published in 2018 with 140 references revealed that those with higher serum vitamin D have an improved odds ratio for developing brain cancer, cervical cancer, endometrial cancer, esophageal cancer, gastric adenocarcinoma, head and neck cancer, hepatocellular carcinoma lymphoma, ovarian cancer, and thyroid cancer.<sup>14</sup>

Furthermore, for many types of cancer, those with higher serum vitamin D at the time of cancer diagnosis have statistically improved survival times.

Given all of this evidence for an association between serum vitamin D levels and cancer protection, it seems obvious that vitamin D supplementation should be protective against cancer. However, a large placebo-controlled study, published in 2019, involving more than fifteen authors, obtained disappointing results.<sup>15</sup>

In this study, over 25,000 participants were monitored over a five-year period. The study population was restricted to men over 50 years old and women over 55 years old, and all participants lived in various places across the United States.

Those who received vitamin D were supplemented with 2000 IU per day. Supplementation did not lower the incidence of invasive cancer or of cardiovascular events, compared to placebo.

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